



UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office

Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

SERIAL NUMBER	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
08/851,608	05/05/97	BULUCEA	C M-799-4C-US

MM21/0520

EDWARD C KWOK
SKJERVEN MORRILL MACPHERSON FRANKLIN
AND FRIEL
SUITE 700 25 METRO DRIVE
SAN JOSE CA 95110

EXAMINER

CARROLL, J

ART UNIT	PAPER NUMBER
2811	29

DATE MAILED: 05/20/98

This is a communication from the examiner in charge of your application.
COMMISSIONER OF PATENTS AND TRADEMARKS

☐ This application has been examined. ☒ Responsive to communication filed on 27 March 1998. ☒ This action is made final.
A shortened statutory period for response to this action is set to expire _____ month(s), _____ days from the date of this letter.
Failure to respond within the period for response will cause the application to become abandoned. 35 U.S.C. 133

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

- | | |
|-----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| 1. <input checked="" type="checkbox"/> Notice of References Cited by Examiner, PTO-892. | 2. <input type="checkbox"/> Notice re Patent Drawing, PTO-948. |
| 3. <input type="checkbox"/> Notice of Art Cited by Applicant, PTO-1449. | 4. <input type="checkbox"/> Notice of informal Patent Application, Form PTO-152. |
| 5. <input type="checkbox"/> Information on How to Effect Drawing Changes, PTO-1474. | 6. <input type="checkbox"/> _____ |

Part II SUMMARY OF ACTION

1. ☒ Claim(s) 17 through 23, 25 through 42, 44 and 46 through 65 are pending in the application.
Of the above, claim(s) _____ is withdrawn from consideration.
2. ☐ Claim(s) _____ has been canceled.
3. ☐ Claim(s) _____ is allowed.
4. ☒ Claim(s) 17 through 23, 25 through 42, 44 and 46 through 65 are rejected.
5. ☐ Claim(s) _____ is objected to.
6. ☐ Claim(s) _____ are subject to restriction or election requirement.
7. ☐ This application has been filed with informal drawing(s) under 37 C.F.R. 1.85 which are acceptable for examination purposes.
8. ☐ Formal drawing(s) are required in response to this Office action.
9. ☐ The corrected or substitute drawings have been received on _____. Under 37 C.F.R. 1.84 these drawings are ☐ acceptable. ☐ not acceptable (see explanation or Notice re Patent Drawing, PTO-948).
10. ☐ The proposed additional or substitute sheet(s) of drawings, filed on _____ has (have) been ☐ approved by the examiner. ☐ disapproved by the examiner (see explanation).
11. ☐ The proposed drawing correction(s), filed on _____, has been ☐ approved. ☐ disapproved (see explanation).
12. ☐ Acknowledgment is made of the claim for priority under 35 USC 119. The certified copy has ☐ been received ☐ not been received
☐ been filed in parent application, serial no. _____; filed on _____.
13. ☐ Since this application appears to be in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11; 453 O.G. 213.
14. ☐ Other

EXAMINER'S ACTION

We have entered as Paper No. 28 the AMENDMENT filed 27 March 1998.

Due to the amendment we withdraw the objection to the first sentence of the Specification, and the rejection of Claim 58 under the second paragraph of 35 U.S.C. 112, as expressed in Paper No. 26.

The presently claimed subject matter complies with the requirements of 35 U.S.C 112.

In consideration of the REMARKS on amendment pages 2 through 8, we express the following observations and opinions.

The Applicants found fault, on amendment page 2, with our response to their unfounded assertion that we engaged in impermissible hindsight and speculation upon application of the applied prior art documentation against the presently claimed subject matter. The Applicants complained that, as a consequence, they were unable to further respond. The Applicants requested that we specifically point out how we applied the prior art documentation.

In response, rather than repeating the entirety of the record here, we recommend that the Applicants reconsider the record. It is our perception that we have specifically pointed out how we have applied the prior art documentation; that the Applicants have repeatedly failed to adequately consider the whole of the prior art teachings and suggestions that we have pointed out; and that the Applicants have repeatedly failed to come to grips with the prior art teachings and suggestions that unambiguously rendered obvious the presently claimed subject matter. We more particularly recommend Papers 12, 14, 17 and 22 wherein we repeatedly weighed the preponderance of evidence taken from Tonnel's detailed method of manufacture illustrated in Figures 4 through 19, combined with the obvious alternative, U-shaped slot embodiment suggested by Tonnel and corroborated by Lisiak *et al.* and Ueda *et al.*, and the obviousness-type double patenting the Applicants have tirelessly attempted. We conclude from the Applicants' complaint and request that the Applicants have inadequately considered the record, including the prior art teachings and suggestions that rendered the presently claimed subject matter unpatentable.

The Applicants indicated on amendment page 3 that Jambotkar did not teach the presence of base regions.

In response, we respectfully disagree because Jambotkar would have disagreed. More particular, Jambotkar advocated a power MOSFET structure that comprised a plurality of closely spaced, P-type substrate regions (18). We identify the P-type substrate regions (18) as being analogous to the claimed body region of Claim 17, for example. As disclosed in the sentence beginning on line 63 of column 1, Jambotkar expected that small distances between the body regions produced high voltage capability in the power MOSFET. Further, as the Applicants successfully excerpted on amendment page 4, Jambotkar disclosed that the close proximity of adjacently disposed substrate diffusions (18) reduced the electric field in the spherical curvature regions of the inner peripheries of the body diffusions (18).

The Applicants indicated on amendment page 5 that large radii of curvature of deep body regions that helpfully assist a power MOSFET to withstand high reverse voltages, as taught by Lidow *et al.* in the paragraph beginning on line 36 of column 6 and, further, as successfully excerpted by the Applicants on amendment page 4, stand as irrelevant to the presently claimed subject matter because Lidow *et al.* allegedly never taught where the breakdown occurred.

In response, we respectfully disagree because Lidow *et al.* would have disagreed. One firstly would have recognized that radii of curvature, as discussed by Lidow *et al.*, had everything to do with diffusion depth, evidently from the presently cited excerpt from the Sze monograph, provided as a reference of interest. Secondly, one would have recognized that electric fields at the deep curvature body junctions far exceeded electric fields at flat, planar body junctions. We thus conclude that Lidow *et al.* expressed where likely breakdown would have occurred. As such, the Lidow *et al.* teachings are completely analogous to the presently claimed structure.

The Applicants incorrectly assumed, on amendment page 6, that an excerpt on the last three lines of amendment page 5, erroneously cited Claim 31.

The Applicants incorrectly alleged on amendment page 7 that the teachings of Yamabe *et al.* have no relevance to at least Claim 23. At least Claim 23, however, called for a trench. The Yamabe *et al.* teachings are relevant at least to a trench. We thus conclude that the Applicants have inadequately appreciated that the applied prior art documentation rendered obvious the presently claimed subject matter.

The Applicants requested where in Hendrickson we found support regarding the disclosure of an hexagonal pattern.

In response, Hendrickson, on line 60 of column 5, referred to the pattern shown in Figure 3A as possessing "six-fold symmetry;" Hendrickson, on line 22-23 of column 6, referred to six-fold symmetry patterns as desirably forming densely packed "hexagonal" matrix structures. Considering that Hendrickson expected one to have advantageously applied hexagonal matrix structures to the V-groove MOSFET embodiment disclosed in Figure 14, much like that disclosed by Tonnel, we conclude it to have been obvious for one to have accordingly disposed the obvious U-slot alternative suggested by Tonnel, into the advantageous hexagonal pattern advocated by Hendrickson. We thus conclude that the Applicants have inadequately considered the record, their presently claimed subject matter, and the demonstration in the record that the applied prior art documentation rendered obvious the presently claimed subject matter.

Not discerning a reasonable basis to conclude that the presently claimed subject matter is patentable, we maintain Claim rejections under 35 U.S.C. 103 and double patenting as expressed in Paper No. 26.

We again reject all Claims.

An inquiry concerning this communication may be directed to Examiner J. Carroll at telephone number 703-308-4926 or, to the Reception Person for Technology Center 2800 at telephone number 703-308-0956. Written communications may be received in Art Unit 2811 at FAX number 703-308-7724.

Respectfully submitted.

